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AUTHOR'S NOTE: Marty Filogamo and Steven Olson contributed to the research in this report.

ABOUT THE CENTER

The Center for Business and Economic Research (CBER) is an award-winning economic policy and forecasting research center housed within Ball State University's Miller College of Business. CBER research encompasses health care, public finance, regional economics, transportation, and energy sector studies.

The center produces the CBER Data Center—a one-stop shop for economic data, policy analysis, and regional demographics—and the Indiana Business Bulletin—a weekly newsletter with commentary on current issues and regularly updated data on housing, wages, employment, and dozens of other economic indicators.

In addition to research and data delivery, the center serves as the business forecasting authority in the Muncie area—holding the annual Indiana Economic Outlook luncheon and quarterly meetings of the Ball State University Business Roundtable.

1. For critiques of the use of these regional impact models in general see Hicks (2007) and with application to sporting events see Seaman (2006).

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The Economic Impact of the Super Bowl in Indianapolis

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Community efforts to attract the National Football League Championship Game are motivated by a number of issues. The Super Bowl is an internationally known, heavily watched event that typically provides a friendly showcase for a city. Pre and post game shows and several days of news events will likely depict a community's many assets and attractions. These are valuable advertising events. A Super Bowl is an excellent opportunity to focus attention on a community's sporting venues, often a desired amenity to businesses and residents. Sporting events like the Super Bowl with their concomitant festival atmosphere are just plain fun, and more welcomed to a community than the highly sought after annual meeting of the American Economic Association. And, of course, the Super Bowl attracts visitors, players, performers, revelers and the media to a community, often for lengthy periods – weeks or months before the game. This has an economic impact on a community in terms of wages, the value of goods and services sold and in tax receipts and expenditures.

This report outlines the economic and fiscal impacts that can be anticipated in Indianapolis, should the Super Bowl come to the city. This is accomplished by briefly reviewing other studies of the Super Bowl's impacts, constructing and testing a model of the Super Bowl's impact using history from actual Super Bowls from 1969 through 2005 and then applying the estimated impact to Indianapolis and the surrounding regions' economy.

EARLIER STUDIES

Estimates of the Super Bowl's impact are typically performed using one of two separate techniques, the regional impact model or econometric models. Perhaps the most common method is the use of regional impact models. These models rely on an estimate of visitor expenditures, which are then used to estimate the local impact. These models have a long vintage, and are easy to explain to both the public and policy makers, making them an attractive tool. These models are familiar, and use visitor expenditures to estimate direct impacts, which are then

adjusted to local conditions to reflect the 'recirculation' of these dollars in the local economy. The additional economic activity they generate are subject to the 'multiplier' effect as the dollars are spent by local firms and workers in the region.

Despite their ease of use, these models are frequently criticized. These models cannot capture labor supply constraints effectively, so may overstate impacts in local employment. Also, they do not permit prices to adjust, and so miss an important element in the impact of a single event like the Super Bowl. Optimistic estimates of visitor expenditures are commonly criticized in the application of these models. Also, failure to account for local visitors (whose spending might simply be redirected from other local venues, and as such do not add to the local economy) are a common problem in these studies.¹

The benefits of the regional impact model is that it does a very good job of connecting local supply chain linkages, and so permits a researcher to disaggregate the impact across different industries. This is important both for firms interested in responding to the visitors to the Super Bowl by adding capacity and for local policy makers who must understand the tax implications of the event, which will vary dramatically by the type of industry affected.

The second method of estimating the Super Bowl's impact is econometric modeling. These models employ historical data to statistically estimate the impact of an event (a Super Bowl in this case) on some measure of economic activity such as personal income. These types of models have a very long pedigree, are much more sophisticated than the input-output models and are typically used in scholarly research. These models are more difficult to employ and interpret, and are sensitive to some statistical considerations. The benefits are that they rely on estimating the contribution of a Super Bowl to a region's economy after the effect has occurred. However, this is often a difficult proposition because so many factors, such as recessions, city specific conditions, weather and events

TABLE 1 – ECONOMIC IMPACT ESTIMATES OF THE SUPER BOWL

YEAR	SUPER BOWL	HOST CITY	HOST STADIUM	ECONOMIC IMPACT (2007 INFLATION ADJUSTED)
1989	XXIII	Miami	Joe Robbie Stadium	\$269 million (a)
1990	XXIV	New Orleans	Louisiana Superdome	\$404 million (a)
1991	XXV	Tampa	Tampa Stadium	\$183 million (a)
1992	XXVI	Minneapolis	Hubert Humphrey Metrodome	\$176 million (a)
1993	XXVII	Pasadena	Rose Bowl Stadium	\$253 million (b)
1994	XXVIII	Atlanta	Georgia Dome	\$183 million (a)
1995	XXIX	Miami	Miami Orange Bowl	\$456 million (a)
1996	XXX	Tempe	Sun Devil Stadium	\$360 million (a)
1997	XXXI	New Orleans	Louisiana Superdome	\$250 million (a)
1998	XXXII	San Diego	Qualcomm Stadium	\$363 million (c) *
1999	XXXIII	Miami	Miami Orange Bowl	\$440 million (d)
2000	XXXIV	Atlanta	Georgia Dome	\$341 million (d)
2001	XXXV	Tampa	Raymond James Stadium	\$306 million (d)
2002	XXXVI	New Orleans	Louisiana Superdome	\$346 million (d)
2003	XXXVII	San Diego	Qualcomm Stadium	\$347 million (g) *
2004	XXXVIII	Houston	Reliant Stadium	\$357 million (d)
2005	XXXIX	Jacksonville	AllTel Stadium	\$317 million (d)
2006	XL	Detroit	Ford Field	\$279 million (e)
2007	XLI	Miami	Miami Orange Bowl	\$463 million (f)
2008	XLII	Glendale	University of Pheonix Stadium	\$350 million (f)

* Direct impacts only

Sources: (a) Coates and Humphreys; (b) UCLA/LA Sports Council; (c) Pricewaterhousecoopers), (d) Depken and Wilson, (e) Rische; (f) Miami Convention and Visitors Bureau; (g) San Diego Citizen's Task Force

2. These concerns have been levied in scholarly papers authored by Baade and Matheson, Depken and Wilson, Coates and Humphreys, Baade and Humphreys, Matheson and Badde and a sole authored paper by Matheson.

such as the Persian Gulf War that are highly idiosyncratic must be disentangled from a Super Bowl's effects. Of course extrapolating these estimates to future events introduces some additional uncertainty that is in common with the first type of modeling.

Economists have criticized estimates of the scale of Super Bowl impact. Their criticism echoes the weaknesses of the regional impact models. Criticism of Super Bowl impact estimates are also extended to a failure to account for local public sector expenditures such as upgrading facilities and providing police protection and other local services.

Table 1 illustrates the most recent 20 Super Bowls along with the published estimates of their economic impacts.

It is worth restating that criticism of the types of estimates displayed in Table 1 have been levied by some economists. These are not idle fears. An overstatement of impacts might lead businesses to over invest in preparation for the Super Bowl, or it might prompt governments to mis-allocate public resources in anticipation of future tax receipts.

The range of estimates of impacts in other scholarly studies range from zero impacts to roughly \$200 million in the

city during a Super Bowl year. In terms of gross impacts, the lower of these estimates would be exceeded simply by accommodations (less meals) for about two thirds of the visitors (perhaps \$30 million).² The higher estimated impacts are roughly those estimated as direct expenditures by out of state visitors to the game (not including the extensive media and NFL staff visitation in the host city).

In the end, we take these concerns seriously. In order to provide conservative estimate, we employ econometric methods of the type used by the critics. However, we employ only cities with a Super Bowl history, since we are concerned that inclusion of additional cities in the sample introduces some statistical problems in the model, which we address in the next section.

TABLE 2 – THE SUPER BOWL'S IMPACT ON INDIANAPOLIS

SECTOR	EMPLOYMENT	WAGES & COMPENSATION	TOTAL OUTPUT
Agriculture	2	\$31,000	\$128,000
Mining	0	\$5,000	\$31,000
Utilities	7	\$864,000	\$3,380,000
Construction	12	\$576,000	\$1,270,000
Manufacturing	26	\$1,862,000	\$9,442,000
Wholesale	32	\$2,155,000	\$5,136,000
Transportation	38	\$1,708,000	\$3,298,000
Retail	272	\$6,750,000	\$15,105,000
Information	17	\$956,000	\$3,788,000
Finance and Insurance	64	\$3,804,000	\$10,896,000
Real Estate	70	\$1,777,000	\$9,934,000
Professional Services	68	\$3,030,000	\$6,263,000
Management	7	\$701,000	\$1,346,000
Administration	68	\$1,873,000	\$3,525,000
Educational	40	\$1,096,000	\$1,887,000
Health Care	228	\$10,922,000	\$18,544,000
Arts and Sporting Events	3,816	\$159,034,000	\$242,614,000
Accommodations	148	\$2,530,000	\$6,861,000
Other Services	108	\$2,520,000	\$4,868,000
Government	9	\$458,000	\$16,359,000
<i>Total</i>	<i>5,032</i>	<i>\$202,652,000</i>	<i>\$364,686,000</i>

Note: Due to rounding, total values may not sum exactly

OUR MODEL

In order to examine the impact of the Super Bowl, we believe it is best to rely on the experience of other cities, in an econometric model. To do this we collected data on all the Super Bowls since 1969. These data included the total personal income in each city in which the game was played. These data were then adjusted for inflation and placed into the following statistical relationship:

$$d(PI) = f(\text{SuperBowl}, X, Z)$$

...where the change in inflation adjusted personal income, $d(PI)$, in each of the cities was a function of a whether or not a Super Bowl was played in the city that year, a variable X that accounted for city specific conditions that did not vary across the years (such as weather and location), and Z , a variable that accounted for conditions that were specific to each city in each year (say a presidential election, bad weather or recession).

This type of model uses the value of personal income in each city in each year from 1969 to 2006 to measure the “average” impact the Super Bowl contributes to personal income the year it is played in a specific city. We would have used earlier data, but the personal income data is not available through the Bureau of Economic Analysis prior to 1969.

This approach is attractive because it does not require us to project potential visitation to the game or other future events. Instead, it gives us the “average” effect of the game in each city, and it permits us to calculate whether or not the impact enjoys statistical regularity across time.³

By constructing our model in this way, we also sidestep two potential concerns with earlier studies. First, we are worried that there is a clear selectivity in the cities that host a Super Bowl. If we include other cities in the sample (as others have) then we introduce a type of statistical bias that may not be mathematically possible to correct.⁴ Further, if we were to isolate our sample to cities that have had a Super Bowl then we avoid the local “crowding out” effect. As any convention traveler will notice from Table 1, many of the cities that have hosted a Super Bowl are well known convention destinations. A Super Bowl obviously displaces another potential convention (as so famously occurred after the NFL game was postponed after the 9/11 attacks, postponing the Super Bowl by a week). If the Super Bowl is simply representative of another convention activity, our statistical model will reveal this only if we restrict our sample to destination cities. There are other concerns with some previous models that are best reserved for more technical reports.

3. The full model is a known as a cross-sectional time series model, with panel corrected standard errors, with an autoregressive (order one) element.

The model itself takes the following explicit specification:

$$\frac{d[\text{Log}(Y_{i,t})]}{dt} = c_i + c + \beta(\text{SuperBowl}_{i,t}) + \delta\phi_{i,t-n} + \gamma T_{1969+n} + \tilde{e}_{i,t}$$

...where the dependent variable (log in change of personal income Y , for county i , in year t , is a function of fixed effects and a common intercept, the Super Bowl binary variable, the n th order autoregressive element, a trend and a PCSE error term, whitewashed with degrees of freedom adjustment.

The data are stationary, following the appropriate tests, and are expressed in 2005 dollars. The goodness of fit measure is a 0.52, and the panel Durbin-Watson is a 1.89. The model is insensitive to the inclusion of a recession variable and cross-sectional specific trends.

4. The problem I refer to is endogeneity bias, that could mis-predict the impacts. This type of bias requires a multiple equation approach that requires that factors that distinguish a community's ability to lure a Super Bowl, but are unrelated to its overall economic growth be found.

Subsequent to our calculations and the performance of a standard battery of statistical tests, we estimate that the Super Bowl game will boost total personal income in the average city by roughly 0.35 percent in the year it is played. This estimate enjoys statistical significance at the 5 percent level, suggesting a great deal of confidence in this estimate.

Applying these results to Indianapolis predicts a one time jump in personal income of \$202.9 million in the year of the Super Bowl (using 2006 data). However, this estimate only accounts for the impact on wages. To extrapolate this to both total output and employment we use a regional impact model. In essence, we have circumvented the weaknesses the input-output model, by not relying on visitor expenditure estimates. But, we exploit its strength in estimating supply chain linkages between industries in the region. Table 2 details the impact of the Super Bowl, expressed in 2006 dollars across the nine county Indianapolis Metropolitan Statistical Area.

Thus, we estimate that if the Super Bowl comes to Indianapolis, the resulting economic impact will be roughly 5,000 full time equivalent jobs paying roughly \$40,000 in total compensation. The total economic impact would be roughly \$364 million in 2006 dollars. This estimate is approximately 5 percent higher than the average of the estimated impacts of the past five Super Bowls. Four of these five estimates were made using similar econometric models.

We offer some caution. We have modeled the effects as happening primarily within the sporting related activities. This was done to accommodate the large influx of NFL and media employees to the region. Some of the impact will undoubtedly be felt more heavily in accommodations than in arts and sporting events. This would not affect the overall numbers or overall compensation, but might influence the share of activity across sectors.

Under Indiana's current tax system, this economic activity would result in roughly \$32 million in total tax receipts to state and local activities.⁵

5. We anticipate that roughly \$2.5 million will be tax exempted through licensing agreements.

SUMMARY

This report offers an estimate of the impact of the Super Bowl in Indianapolis. Using the most conservative approach, I find the impact of the Super Bowl to be a significant, one time increase of \$365 million in total economic activity, resulting in \$202 million dollars in labor compensation and roughly 5,000 employees. State and local tax revenues would top \$32 million under the current tax structure. This estimate is highly consistent with other estimates, and relies on historical data of actual Super Bowl impacts dating back to the 1960s. It is within 5 percent of the average impact estimates for the past five Super Bowls (which is important, since the impacts are apparently increasing with time).

Some caveats remain. This study does not take into account local public sector expenditures, and is thus not a benefit cost analysis of the Super Bowl. It is however, a study that employs the most sophisticated modeling techniques, and which acknowledges the earlier critiques of these types of studies. In the end, this study suggests, as the vast majority that have preceded it, that the Super Bowl would be a significant contribution to the economy of the host city.

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BALL STATE UNIVERSITY CENTER FOR BUSINESS AND ECONOMIC RESEARCH IMPACT STUDY



ABOUT THE CENTER

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